

**HOW TO SELECT**  
**THE *Right***  
**HEATING SYSTEM**  
***FOR YOUR HOME***



**CRANE**

CRANE CO., 836 SOUTH MICHIGAN AVENUE, CHICAGO 5, ILLINOIS



# HOW TO DETERMINE YOUR

Today the development of heating equipment has advanced to the point where families in all walks of life can enjoy the utmost in heating comfort and convenience.

Crane engineering and Crane manufacturing "know how" have aided in this development. For in the Crane quality heating line, you'll find everything for every heating system—regardless of its size or requirements. All parts are designed to work together to give you the greatest heat value at the lowest possible operating cost.

## ANSWERS TO HEATING REQUIREMENT PROBLEMS

### The Fireplace

The first step in selecting your heating plant lies in arriving at a clear understanding of your requirements . . . that is establishing the limits to which control over atmospheric conditions in your home is necessary. This is the first step because those limits can vary with the circumstances of time, season and place. And the heating equipment you require should take into consideration those variations.

For example, if you are building a one-room cabin in which to spend your summer vacations, the only weather conditioning you will want is a heat source sufficient to provide warmth on an occasional cool or rainy evening. For this purpose what could be better than a picturesque and friendly fireplace? However, if you plan to occupy that cabin in the spring and fall while the nights are chilly, then a fireplace may not be enough.



### The Individual Room Heater



Under these circumstances, you may want to put in a stove or room heater. As long as the area to be heated is small enough and the occasions are few enough, the distribution of warmth it represents will probably satisfy you.

But if, instead of a temporary structure, you are building a permanent home . . . one which you will occupy the year 'round . . . then the whole basis for evaluating comfort changes. You have to think in different terms, satisfy different and much more demanding requirements.

### Year 'Round Weather Making

You have to think in terms of a system capacious enough and flexible enough to maintain an equitable temperature

throughout a many-partitioned, many-windowed house . . . regardless of how the thermometer outdoors bounces from zero to thaw and back again.

If you live in a section where the summer heat is also hard to bear, you may want to think, too, in terms of equipment for circulating air and cooling that house.

Most important of all, you have to think of these things not in general terms, but in those which have a direct bearing on your budget, your family, and your home. Factors, which demand from you a pretty clear conception of what you're after and how you propose getting it. Basic to this, of course, is a grasp of the principles involved in the heating and cooling of air.

### Modern Home Heating

Nature has established two channels for the transmission of heat: **DIRECT RADIATION** and **CONVECTION**.

Direct Radiation can be defined as the transmission of heat through space via waves. The simplest and best example of this is the sun. Its heat, as you know, travels to the earth in the form of infra-red rays.

The second channel for heating, Convection, can be defined as heat transmission by circulation. Under this method warm air is circulated by reason of the difference in weight between it and cold air.

### Applying These Principles



Convection heating is the principle behind the familiar warm air system. Steam and hot water, by way of contrast, combine Direct Radiation with Convection; since the radiators they use as heating elements not only act like small suns, insofar as they transmit their warmth through infra-red rays, but also establish convection currents of warm air which circulate throughout the room.





# HEATING REQUIREMENTS

Crane Co. has prepared this book to help you determine your heating requirements and serve as a guide in choosing a heating plant to best meet your needs.

A word of advice. Before making your final selection, consult your Architect, Heating Engineer or Heating Contractor. His knowledge of heating, gained from years of experience, will often save you many dollars. For heating systems should be designed to heat a specific type of home adequately and economically for many years.

## AIR CONDITIONING



Hand in hand with heating and, in one important sense, a vital part of it, is air conditioning. Air conditioning includes heating air, cleaning it, humidifying it or dehumidifying it and cooling it. Air treated in any one of these ways is conditioned. To fall into the popular error of thinking of air conditioning as only a method of cooling the air in your home is to set unnecessary limits on your ability to choose the right heating plant. The fact is air conditioning should be considered on the double basis of conditioning in winter and in summer.

### Winter Air Conditioning

In addition to warming air to a livable temperature and holding it there, winter air conditioning includes washing, filtering and humidifying. All three of these operations have a direct bearing on making the air in your home more invigorating and healthful. All three of them are applicable whether you use Convection (warm air) heating or Convection plus Direct Radiation (steam or hot water) heating.

Naturally the degree to which you can enjoy winter air conditioning is determined by the equipment you install. If you use a furnace, cleaning and humidifying equipment can be made an integral part of your warm air system. If you use steam or hot water, cleaning and humidifying equipment may be installed as a separate unit. With such a system, it becomes possible to limit winter air conditioning to the rooms where it is needed.

For example, kitchens ordinarily receive enough humidity from cooking vapors. Bedrooms are occupied only at night and then are open to the outside air. Bathrooms are, as a rule, amply humidified at all times. This leaves only living and dining rooms, and through the use of an economical split system, the cost of winter air conditioning them can be held to a moderate figure. Consult your Heating Contractor for details.

### Summer Air Conditioning

Summer air conditioning calls for the refrigeration of air plus the necessary humidification or de-humidification. Because the cost of the equipment involved amounts to an important figure, you may want to consider less expensive methods of increasing comforts during hot months.

One of these lies in providing self-contained, small-size cooling units in certain rooms of your home. Another and frequently satisfactory method results from adding some device to create greater circulation of air.

The fan used with a forced warm air system is not recommended for this purpose. A better method is to install an attic fan which will provide satisfactory circulation during the day and draw cool air in during the night.

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*So far, only the broad classifications in heating systems have been presented for your consideration. Now, to serve you as an aid in selecting the kind of plant specifically suited to your home and circumstances, the most practical and generally used types of central heating plants are diagrammed and described on the following pages. But in reading them, remember that to be thoroughly satisfactory, your heating system must be planned in every detail for your home. Therefore, before you decide on any one system, consult your Architect or Heating Contractor.*



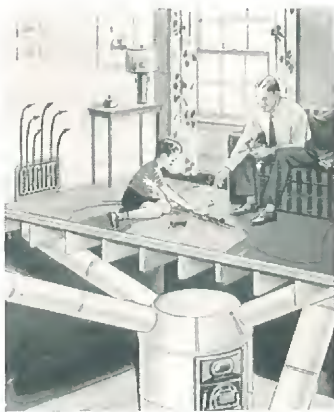
# THE CENTRAL HEATING PLANT

You will have noticed that no matter whether Convection Heating or Radiation Heating was under discussion, it was necessary to revert constantly to the equipment on which the application of each depends. Regardless of where you start your thinking about making your own weather, you first have to settle on which of these two basic systems you want.

To some degree, that decision may be determined for you by the type of house you occupy or plan to occupy . . . its size, location, and floor plan. But granting that house is equally suited to heating with warm air, hot water or steam, then your choice should be based on a careful evaluation of the specific advantages each offers.

## Warm Air

A warm air system is exactly what its name implies: an installation designed to heat your home by warming the air in a furnace and circulating it through the house. It consists of a furnace and a number of ducts to distribute heated air and collect cold air.



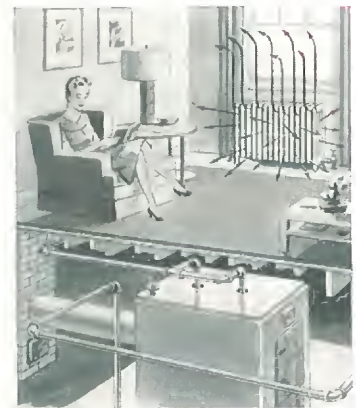
On the plus side, warm air, in its simplest form, often proves itself the least expensive kind of central heating. Moreover, it heats rapidly and makes for a neat room installation, since the registers may be placed in the walls, leaving all the floor area free for the arrangement of furniture.

But there are certain other factors which must be taken into consideration. To get all the comforts warm air holds for you, such as filtering and humidifying, washing and forcing circulation, expenses are incurred which increase its cost to a point where it approximates that of steam or hot water heat.

Again, since with this type of system it is always advisable to locate registers on or against inside walls, no provisions are made to warm the cold sides of your house. Finally, the very speed and directness with which the system can be started and stopped may be the cause of undesirably sudden fluctuations in room temperature.

## Steam, Hot Water

In these systems steam and hot water are piped from the boiler to room radiators. The only basic difference between the two is that in one, water is boiled until steam is formed—in the other, the warm water is circulated.



Steam and hot water offer advantages in common. Radiators once heated are slow to cool when the fire is checked, and a more even temperature in the room is thus assured. Radiators may be placed against outside walls and under windows to heat those sections of the room that are normally coldest. The cost of a radiation system is comparable to that of a good warm air system.

With steam heat, radiators remain cold until water in the boiler is heated to the boiling point to produce steam. The higher temperature of steam means hotter radiators. In a hot water system, water circulates as it is heated. Radiators start heating sooner—cool more gradually.

The objection that radiators occupy floor space is in a large measure overcome by modern slim tube radiators. They also may be recessed into walls or behind grilles, thus requiring no floor space. Most interesting of all, perhaps, is Crane's Radiant Baseboard Heating . . . a new type radiator described on page 14.

# AUTOMATIC HEATING

Having given general consideration to the type of heat and the kind of equipment available, the next step is to decide what fuel you are going to burn and whether your system is to be a manual or automatic one.

A manual system represents economy in purchase and installation cost. An automatic system means savings in time and energy and operating cost. Coal is the only fuel which may be used successfully in a hand-fired system. However, coal may also be used in an automatic system. Before deciding on the fuel best suited to your needs, you will want to study carefully the fuels available in your neighborhood. For the cost of heating with coal, oil and gas can vary greatly from area to area.

The information below on fuel for automatic heating may help you decide on the type of system you want.



## Coal

Automatic heating with coal requires the installation of a stoker. These are made in two basic types: the hand-filled hopper type and the self-feeding bin type. The former is economical in first cost, practical,

and widely used. The latter absolves its owner from the necessity of shoveling coal, but is usually more expensive and the extra work it saves should be carefully balanced against the extra cost. Both require very little other attention, they regulate temperatures automatically and burn the cheaper grades of coal with a minimum of smoke, soot ash and clinkers. For further information see page 15.



## Oil

Fully automatic heat with oil is obtained by installing an oil burner in connection with a boiler or furnace. A thermostat controlled from the living room maintains the temperature at the desired level. The only attention

an oil-fired system requires is the occasional filling of the oil tank. For the most satisfactory results, choose a self-contained "packaged" unit: one in which the boiler and burner have been designed as a single unit. When this is not practical, a satisfactory compromise can be effected by using a good conversion type oil burner in connection with a boiler or furnace. The equipment required for both types of plans is illustrated and described on page 15.



## Gas

With gas heating, all the advantages of automatic heating are secured. Once a gas burner is installed, a room thermostat maintains the desired temperature. The only responsibility that rests on the owner of the plant is turning the pilot light on in the fall and turning it off in

the spring. A gas conversion burner can be used in connection with a boiler or furnace designed for other fuel. But if you are investing in a new system, it is usually more economical to pick a boiler especially designed to burn gas. The equipment required for both types of installations is pictured and described on pages 12 and 13.

## YOUR FINAL STEP

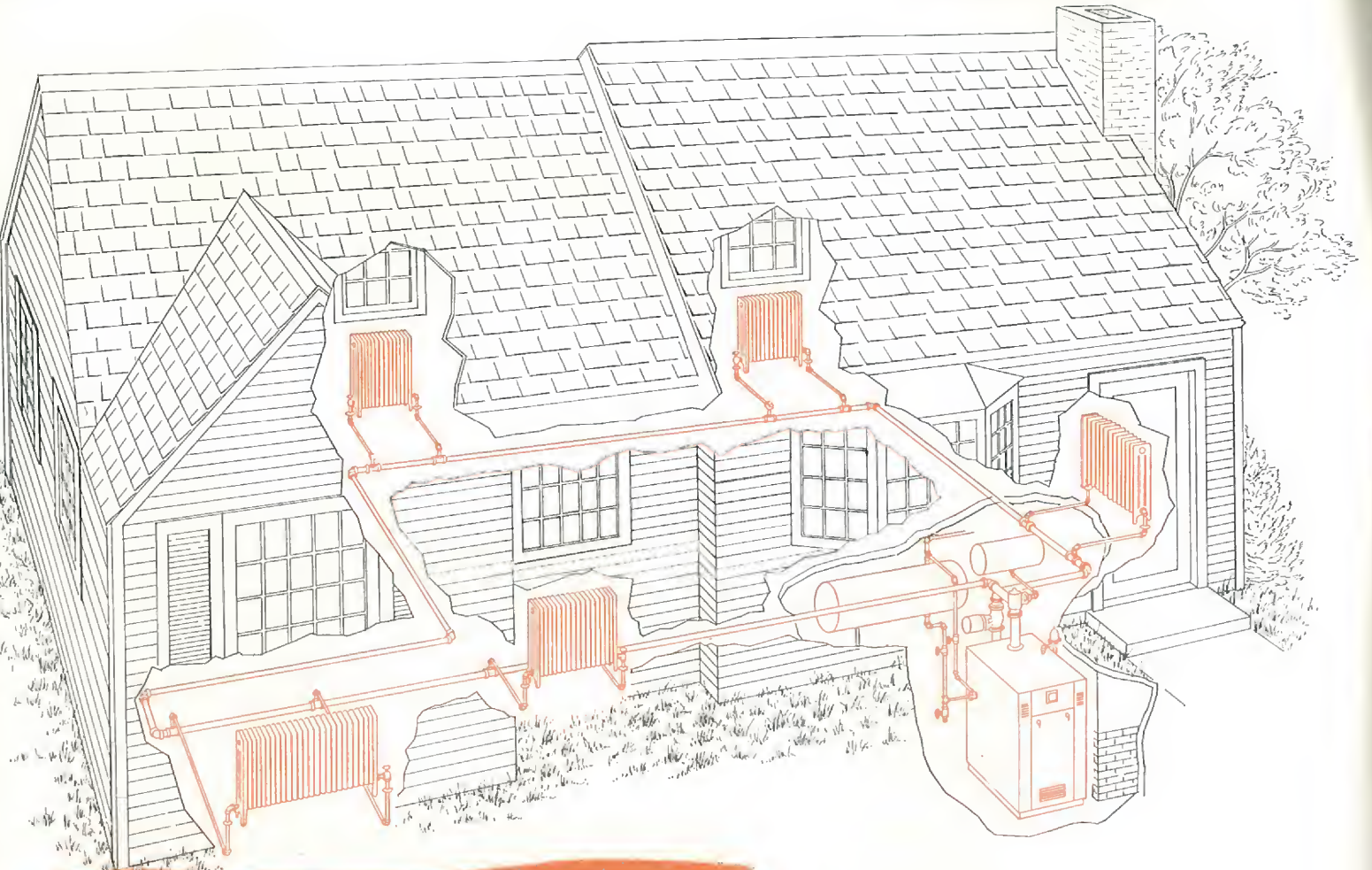
So far, only the general principles of manufacturing your own weather have been presented. Now, to aid you in selecting specific equipment, the basic types of central heating systems are described on pages 6 to 11.

But in weighing one system against another, remember these are not standard units designed to be interchangeable. Rather, they are key materials to be fitted into individually engineered installations. Therefore, we urge you to consult your Heating Contractor or Architect before

you commit yourself too fully to any type or kind of system.

For the same reason, individualization, we suggest that in purchasing the equipment they recommend, you go to a Crane Dealer. He is the logical choice because, as a Crane Dealer, he is able to furnish *all* the materials necessary for *every* kind of heating plant. Thus, he can give you unbiased advice . . . he has no ax to grind. Thus, too, he can be depended upon to work with you in planning a system based on your requirements, not his limitations.





# Forced HOT WATER HEATING SYSTEM



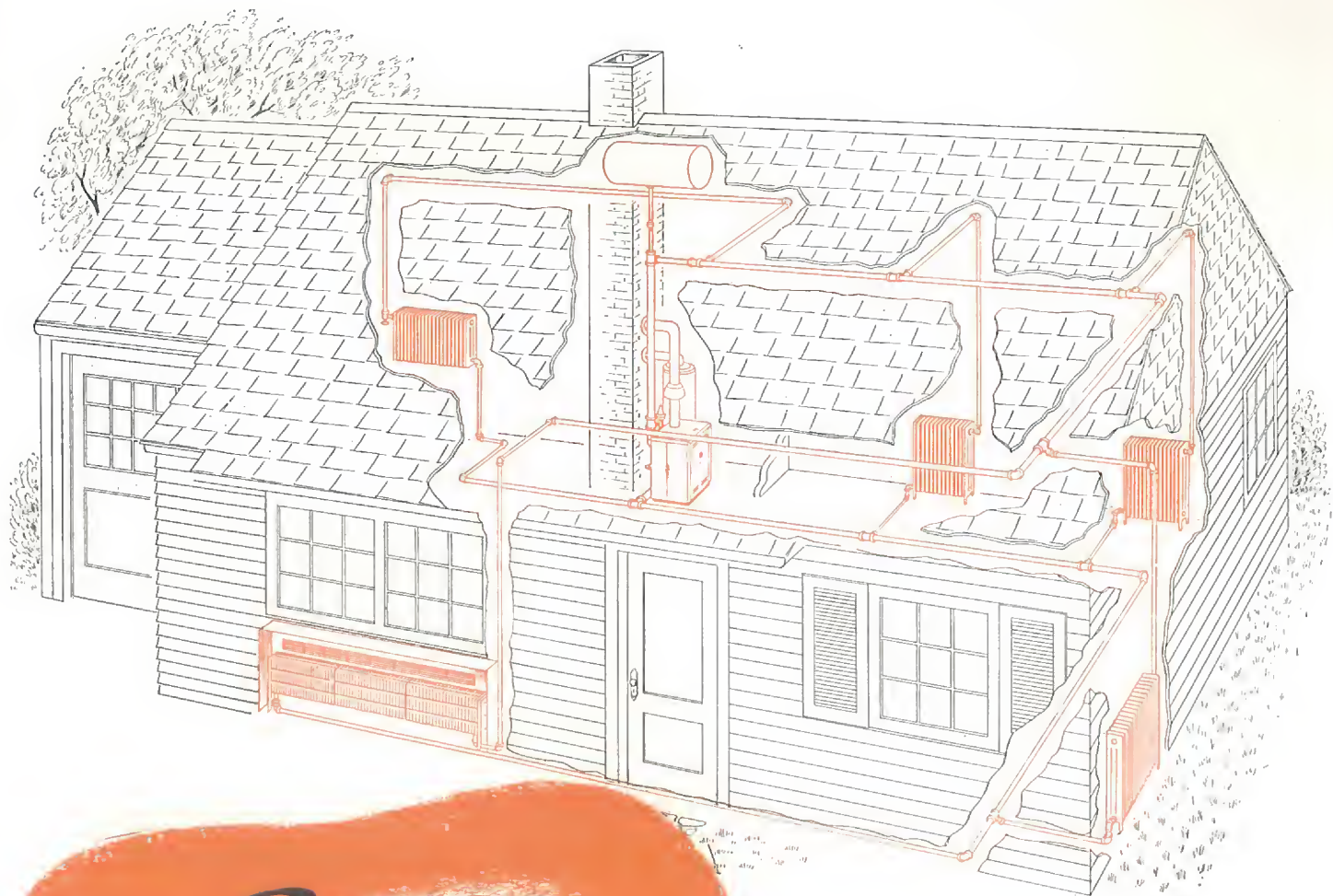
Forced hot water systems are of two basic types: two-main and single-main. In the two-main, circulation of the hot water is accomplished through separate supply and return pipes.

The single-main, on the other hand, eliminates one set of pipes through the use of special circulating fittings. Both systems use a circulating pump which assures rapid movement of the hot water through the radiators. Recently developed, the single-main system is gaining in popularity. It provides a fast, flexible method of heating residences of all sizes and requires smaller and less expensive pipes than either steam or

gravity hot water. Also, its cost of operation is relatively lower than that of the others.

Forced hot water systems may be used in houses with or without basements. When automatic firing and control is employed, a hot water supply for year 'round domestic needs can be obtained through the addition of an indirect water heater. Any of the Crane boilers illustrated on pages 12 and 13 may be used with this system, any fuel may be burned, and with the addition of the split system mentioned on page 3, forced hot water heating system is ideal for full winter air conditioning.





## Gravity HOT WATER SYSTEMS



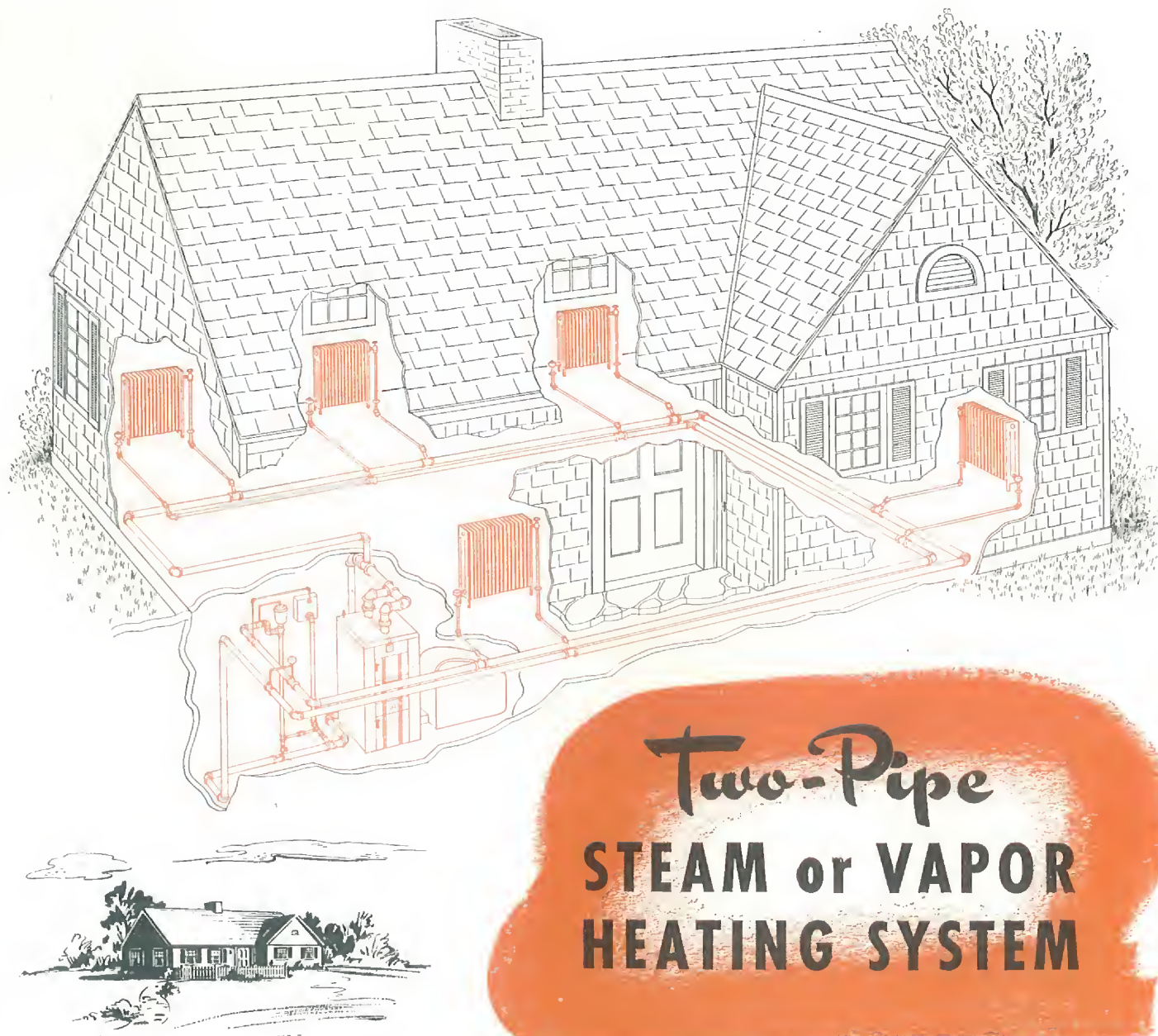
This system is simple to install and moderate in cost. It depends for its operation upon the fact that hot water, being lighter than cold, rises. Thus, as the water is heated, it circulates naturally through pipes and into radiators in each room. Gravity hot water requires two sets of mains. One to carry the hot water up, the other to carry the cooled water back to the boiler for reheating.

An advantage of any hot water system is its flexibility. It is not necessary to circulate water at high temperatures. In spring and fall, when very little heat is required, this is particularly desirable. Furthermore,

because the heating medium is hot water and the radiators are of cast iron, this system is slow to cool and more even temperatures are assured.

When the system is automatically fired, a year 'round supply of domestic hot water may be had with the addition of an indirect water heater.

Gravity hot water may be installed in houses with or without basements, but should be centrally located to avoid long, lateral pipes. Any Crane boiler illustrated on pages 12 and 13 may be used. Hand or automatic firing is optional . . . so is the split system which provides winter air conditioning.



## Two-Pipe STEAM or VAPOR HEATING SYSTEM

Two-pipe steam or vapor heating provides an effective way of utilizing steam as a heating medium. In it the steam is circulated to the radiators through one set of pipes and the condensate or water is returned to the boiler through a separate set. This assures rapid circulation, and permits the system to be operated at lower pressures than would otherwise be possible.

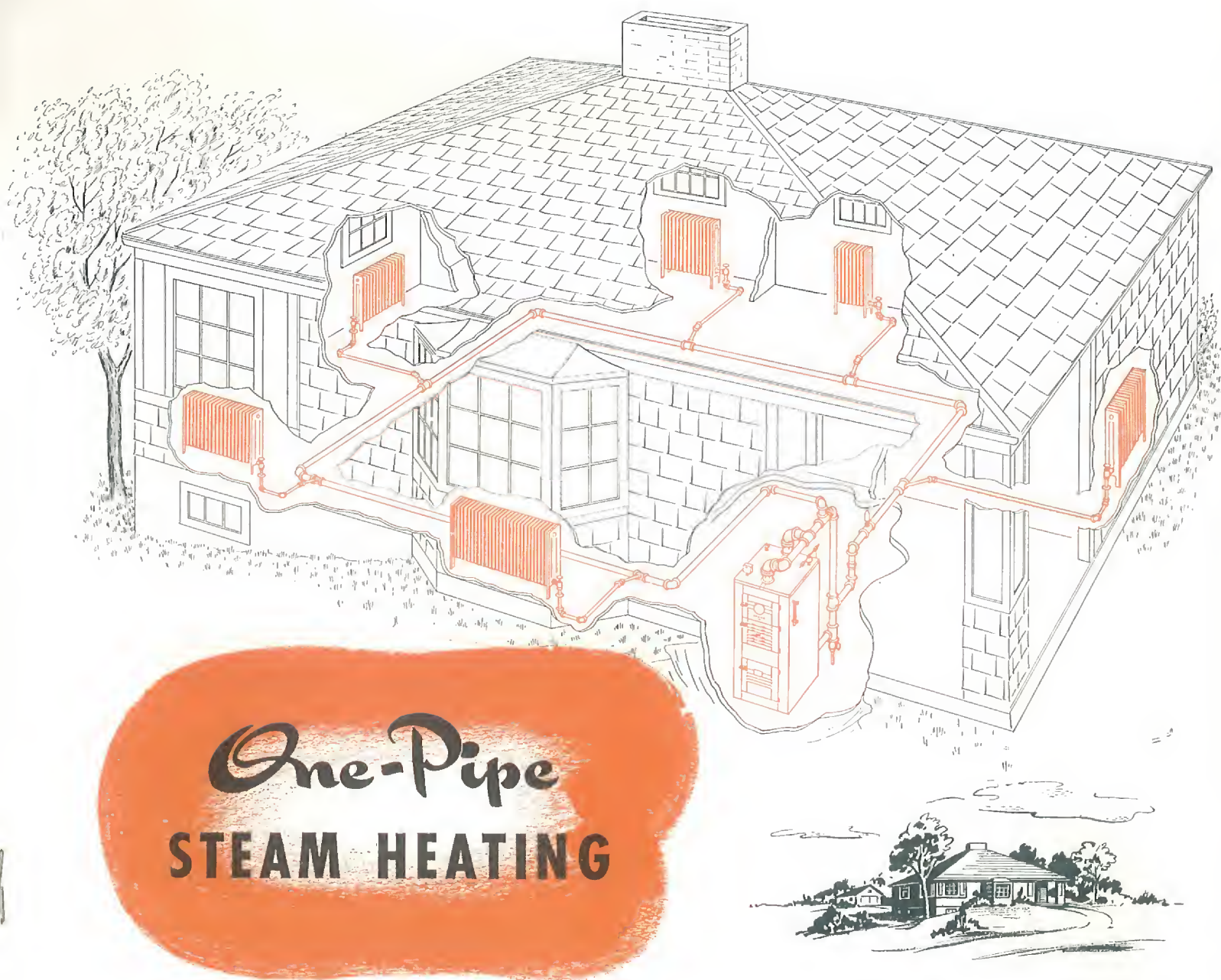
The two-pipe system may be used in houses without basements as well as in those with basements. Installation in the former, however, requires the use of a

condensation pump to return the condensate, or water, to the boiler for recirculating.

A coal stoker, oil or gas burner and controls may be used if desired. When automatically fired, a year 'round supply of domestic hot water may be had by adding an indirect water heater to the boiler.

For information on the boilers adaptable to this system, see pages 12 and 13. And for ways to provide winter air conditioning, talk to your Architect, Heating Engineer or Dealer.





## One-Pipe STEAM HEATING

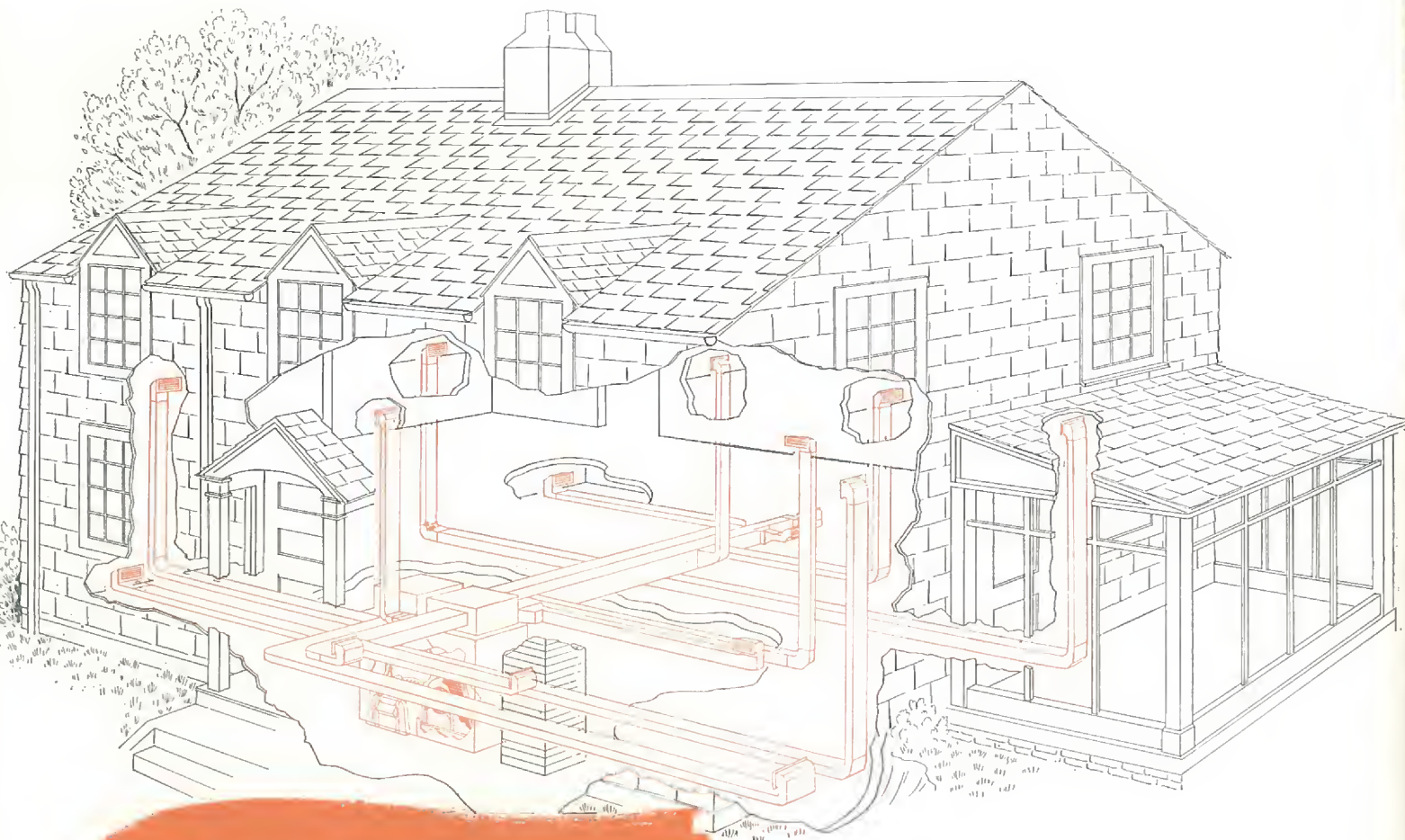
This is the simplest of the steam heating systems which make possible the comfort and convenience of radiation heating. The cost of installing it is less because only one pipe is needed to circulate the steam and return the condensate to the boiler. In houses lacking basements, a condensation pump must be installed.

Many users have found this system durable and very satisfactory . . . for it heats rapidly and cleanly. The equipment required includes a boiler, radiators, air vents, pipe, valves and fittings.

If the system is to be automatic, a coal stoker, oil or gas burner and controls must be included. When thus equipped, the system can be used as a year 'round source for domestic hot water by the addition of an inexpensive indirect water heater.

The above illustration shows a one-pipe system equipped with a Crane hand-fired boiler. Boilers, coal stoker and oil burner unit available for use with one-pipe heating systems are illustrated and described on pages 12 and 13.





# Forced WARM AIR HEATING SYSTEM



The equipment required for a forced warm air heating system includes a furnace, circulatory fan, ducts, controls and registers.

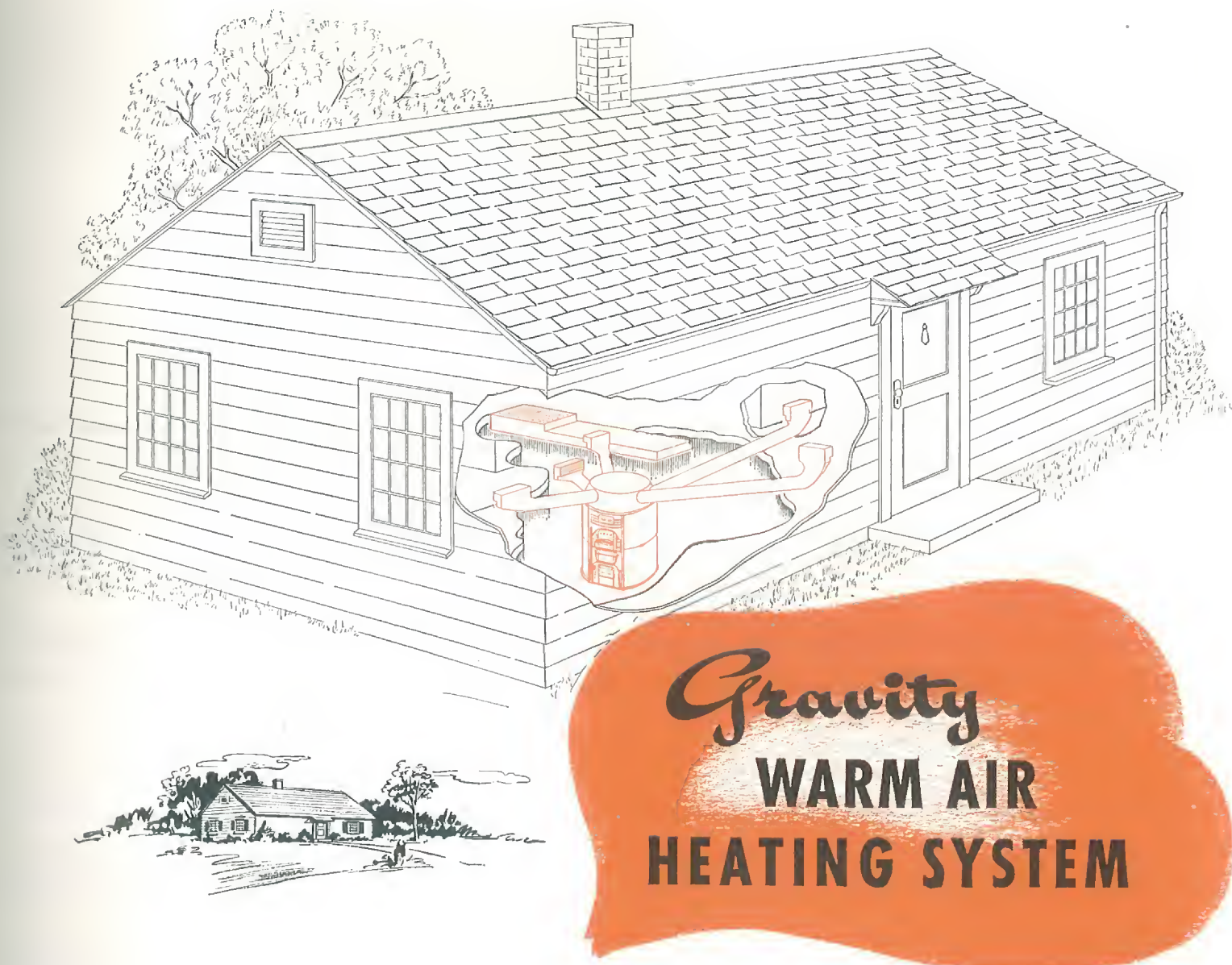
The furnace may be located in any part of the basement or the system can be used in a house without a basement since a circulating fan can be relied upon to force the warm air into the rooms through the ducts.

For the same reason, some latitude is permissible in locating registers. However, for greatest efficiency, it is advisable to place warm air ducts and registers on

inside walls, as close to the furnace as possible. The shorter the distance the warm air has to travel the greater the efficiency of the system. A separate set of ducts is needed to return cold air to the furnace.

One advantage offered by the forced warm air system is the ease with which winter air conditioning equipment—filters, humidifiers, and air washers—may be added. Separate provisions, however, must be made for domestic hot water during the summer months even when the system is automatically fired.





## Gravity WARM AIR HEATING SYSTEM

This is the simplest of central heating plants. Air warmed in a furnace is distributed to the rooms through one set of ducts. Cold air is gathered and returned to the furnace for reheating by a second set.

Since the process of circulation depends entirely on the small difference in weight between the cool and the heated air, no sharp angles or long lateral ducts are permissible. This means that the furnace must be placed in the center of the basement, equidistant from all rooms, and the registers must be placed on or

against inside walls . . . not only for the sake of using shorter ducts, but also because contact between the warmed air and a cool outside wall retards the flow.

With a gravity system, a humidifying device may be installed, but filters and air-washers are not practical.

The cost of a gravity warm air system depends on the number of return ducts employed. The more numerous they are, the more efficient the system will be, but the more costly, too. Furnaces for gravity warm air systems are illustrated and described on page 13.



# CRANE Boilers

## FOR STEAM AND HOT WATER

In considering the purchase of a boiler or furnace, remember that among the important points you want to check is capacity. Make sure that it doesn't fall short of your maximum requirements, yet won't waste heat by exceeding them.

With its rank efficiency, dependability, smartness in appearance. For you want to make sure that the boiler or furnace you choose will continue to represent a sound investment for many years after you've installed it.

Crane quality boilers and furnaces meet each of these demands. Among them you will find the exact size and type established by the volume of your house, its location and architectural style. You will find, too, models that can be proudly installed in the basement playroom.

Most important of all, you will find models redesigned to incorporate all the recent advances made in heating as well as the basic improvements learned through decades of progressive manufacturing.



### CRANE FOURTEEN Boiler

The CRANE FOURTEEN for steam or hot water systems is a newly designed boiler especially constructed to pack big heating capacity into small size. It has a completely water jacketed combustion chamber which adds to effective heating area—permits direct installation on wood floors—and makes possible gravity systems in homes without basements. May be installed for hand or stoker-fired coal or used with an oil or gas conversion burner.



### CRANE SIXTEEN Sustained Heat Boiler

This is a highly efficient, "packaged" oil burning unit in which the boiler and burner are designed for each other. The patented sustained heat principle, exclusive with Crane, cuts fuel costs by preventing the escape of heated gases into the chimney when the burner shuts off. The CRANE SIXTEEN Sustained Heat Boiler is completely enclosed in a handsomely enameled insulated steel jacket, making it a fine unit for playrooms, laundries, and utility rooms.



### CRANE TWENTY Boiler

The CRANE TWENTY Boiler is new. It offers such modern fuel saving advantages as extra large ceiling heating surface, improved flue design, and the Crane patented baffles for directing water travel over the spot where the fire burns hottest. Made in seven sizes for steam or hot water heat. Its extra high, 12-inch base combines with its removable grate lugs to make it especially suitable to stoker firing. May also be equipped for burning oil or gas.



## Sectional Boilers

Crane Sectional Boilers are made in a variety of sizes and styles for large homes, apartments, offices and public buildings. Inexpensive in original cost, they are scientifically designed and built to save fuel dollars. They include patented baffles to direct water travel over the hottest part of the fire—reducing turbulence at the water line—and producing drier steam. Suitable for installation with modern automatic firing equipment, coal, oil or gas.



## GAS FIRED BOILERS



### Series Twenty-five Basmor Boiler

This Series TWENTY-FIVE Basmor boiler is designed for steam or hot water systems. High efficiency is assured by the Basmor staggered flue construction, while the Basmor Butterfly Burner provides for complete combustion of natural or manufactured gas. All controls for fully automatic operation and complete safety are concealed in its handsome steel jacket.

### 2WG Gas-Fired Boiler →

In spite of its extreme compactness (less than 36 inches high) the 2WG will do a complete and safe job of heating your home. Because of wet base construction, it may be installed on wooden floors without insulation. Comes with all controls attached ready to connect to the piping. Smart looking, fully jacketed, fully insulated.



## CRANE WARM AIR FURNACES



### Coal-Fired Round Furnace

This furnace combines quality with low price. The radiator may be had in cast iron or steel. The casing is of heavily galvanized sheet iron. Can be equipped with a fan for forced circulation if desired.



### Oil-Fired Furnace

Here is a compact, oil-fired furnace equipped to filter, humidify and circulate warm, conditioned air. Includes the efficient Crane Conservoil Burner. Burns inexpensive grades of oil without odor or trouble.



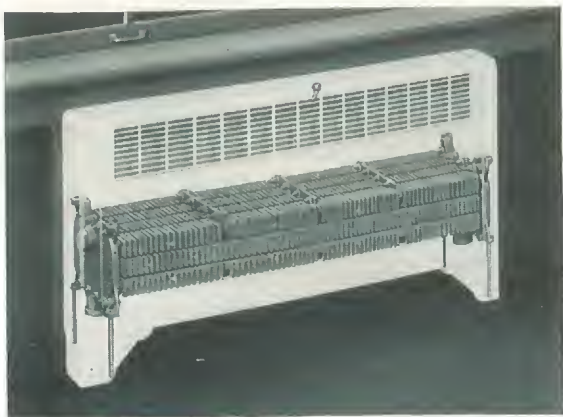
### Gas-Fired Winter Air Conditioning Unit

The Basmor Gas Air Conditioning Unit is fully automatic, absolutely safe in operation. Warms, filters, humidifies and circulates air. Ideal for utility room installation in homes without basements.



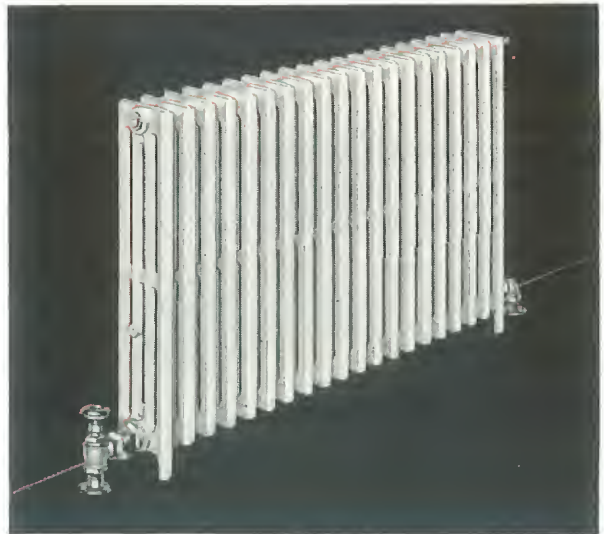
# **CRANE** radiation **FOR THE MODERN HEATING SYSTEM**

Crane Radiators are made in sizes and types for every installation. Among the three shown here you will find stimulation, not only for planning greater comfort, but also for planning an improvement in the appearance of your home.



## **Convectors**

Crane Convectors make an attractive installation and harmonize perfectly with any room decoration. Heavily finned and made of cast iron, they are concealed behind handsome panels. The warm air is distributed from them through grilles. Crane Convectors may be fully or partially recessed or may be installed as free-standing units.



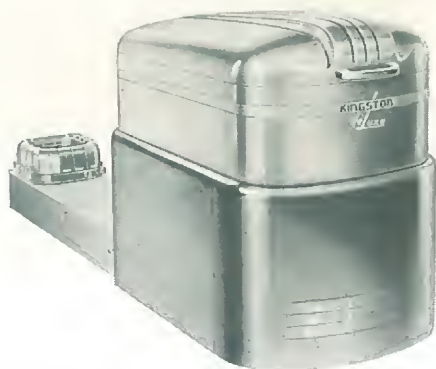
## **Compac Radiators**

Slender in line—modern in design—Crane Compac Radiators represent a step forward in home heating beauty and comfort. The diameter of the radiator section, the thickness of the walls, the ratio of water content to heating surface—all have been scientifically calculated to give you the same efficiency in these small radiators that you get in larger ones. May be installed as free-standing units or recessed into the wall with or without panels.

## **RADIANT BASEBOARD HEATING**

The newest thing in heating . . . developed by Crane engineers! Sturdy cast iron panels circulate steam or hot water heat. Look just like baseboards and are substituted for them. Rooms are evenly heated at floor level and no valuable floor space is occupied by radiators or grilles permitting furniture arrangement exactly as you want it. If you are planning to build a new house or modernize the heating system in your present one, be sure to inform yourself fully concerning this new heating development.





### Kingston De Luxe Stoker

An efficiently engineered stoker that economically brings all the advantages of automatic heat. Designed for efficient combustion of coal. By proper combustion, it obtains more heat units from the fuel and also permits use of cheaper grade of coal. Provides even temperature, eliminates smoke nuisance and loose ash.

### Conservoil Burner

A quiet, efficient oil burner that is extremely simple in design, has only one moving part. Its "floating flame" burns in complete suspension. This means clean operation. The Conservoil's blower and air control housing are cast as a single unit to assure perfect alignment and quick interchangeability of parts. Permits the burning of cheaper grades of oil without waste or unpleasant odors.



# EQUIPMENT...

## TO COMPLETE YOUR HEATING SYSTEM



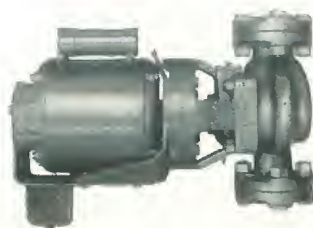
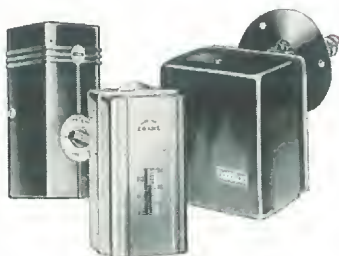
### Valves and Fittings



Small parts of the heating system, but extremely vital. The complete Crane line includes valves and fittings for every type of installation.

### Automatic Controls

An automatic heating system needs controls that operate instantly and require minimum attention. The Crane line of quality controls is complete.



### Water Specialties

Crane hot water specialties are made to suit every installation. They include water heaters, circulators and flow control valves.

### Water Heaters

Water, piping hot, at any time of day or night—summer or winter—no delay—just turn on the faucet—that is the convenience a Crane water heater will bring you. What's more, Crane water heaters are designed with modern, money-saving features and assure utmost economy and safety in operation. Sizes and styles to suit every home.



### Internal Heaters

A highly efficient internal water heater that is standard equipment on the CRANE SIXTEEN Conservoil Burner and may be installed in the CRANE TWENTY and CRANE FOURTEEN Boilers. Cold water flows through the heater—warms to the proper temperature and is stored in the tank for use. Except under very unusual circumstances, the heater will provide ample hot water for all household needs.



*Now—*

## to assure lasting satisfaction from your heating system...

*these 4 steps are necessary*



Complete satisfaction—carefree comfort throughout the years to come—that is what you expect of your heating system.

If you have used the services of an Architect in the designing of your new home, either he or the Heating Engineer will see that these benefits come to you.

In the case of modernizing an old heating system, your Crane Heating Contractor will provide these services to assure you of satisfaction.

And, too, where the heating system of a new home is planned by the Architect or Engineer, your Heating Contractor will see that it is properly installed. His knowledge and judgment will aid you in selecting a heating plant "tailor-made" to the size and type of your home. His installation and the services he offers are your assurance of proper, economical heating.

**1.** Your Architect, Engineer or Heating Contractor, in planning a heating system, first makes a complete thermal survey of your house. Carefully, scientifically he calculates such important matters as heat loss . . . amount of radiation required . . . proper location of radiators or convectors. This scientific approach to your heating problem is assurance that the system you install will best meet the needs of your home.



**2.** After the heating system best suited to your home has been determined, taking into consideration local conditions, your Heating Contractor prepares a complete specification of materials. The fuel may be coal,

oil or gas; you may prefer hot water or steam, single or double pipe system—no matter, the system he recommends will be completely unified, designed to heat your home efficiently.

**3.** Working from a carefully prepared plan, the Heating Contractor next installs your system, using skilled, efficient workmen. Much of the efficiency of a system depends on the installation; and the training and experience of the Heating Contractor are your assurance that the system will give you the maximum heat from the fuel you burn—assure you years of satisfaction as well.



I-B-R ratings mean your boiler and radiators have been rated for actual heat output. Thus, you can be sure the equipment will produce the amount of heat specified.

**4.** Your Heating Contractor is an established member of your community. He is permanently in business to give you the kind of equipment—the kind of service you should have for years to come. His ability to furnish you with the system best suited to your needs assures you that he places your interests first in recommending a heating system. He will welcome a call from you.